

Fig. 1 Block Diagram of Complete Instrument, SPM-31/PSE-31

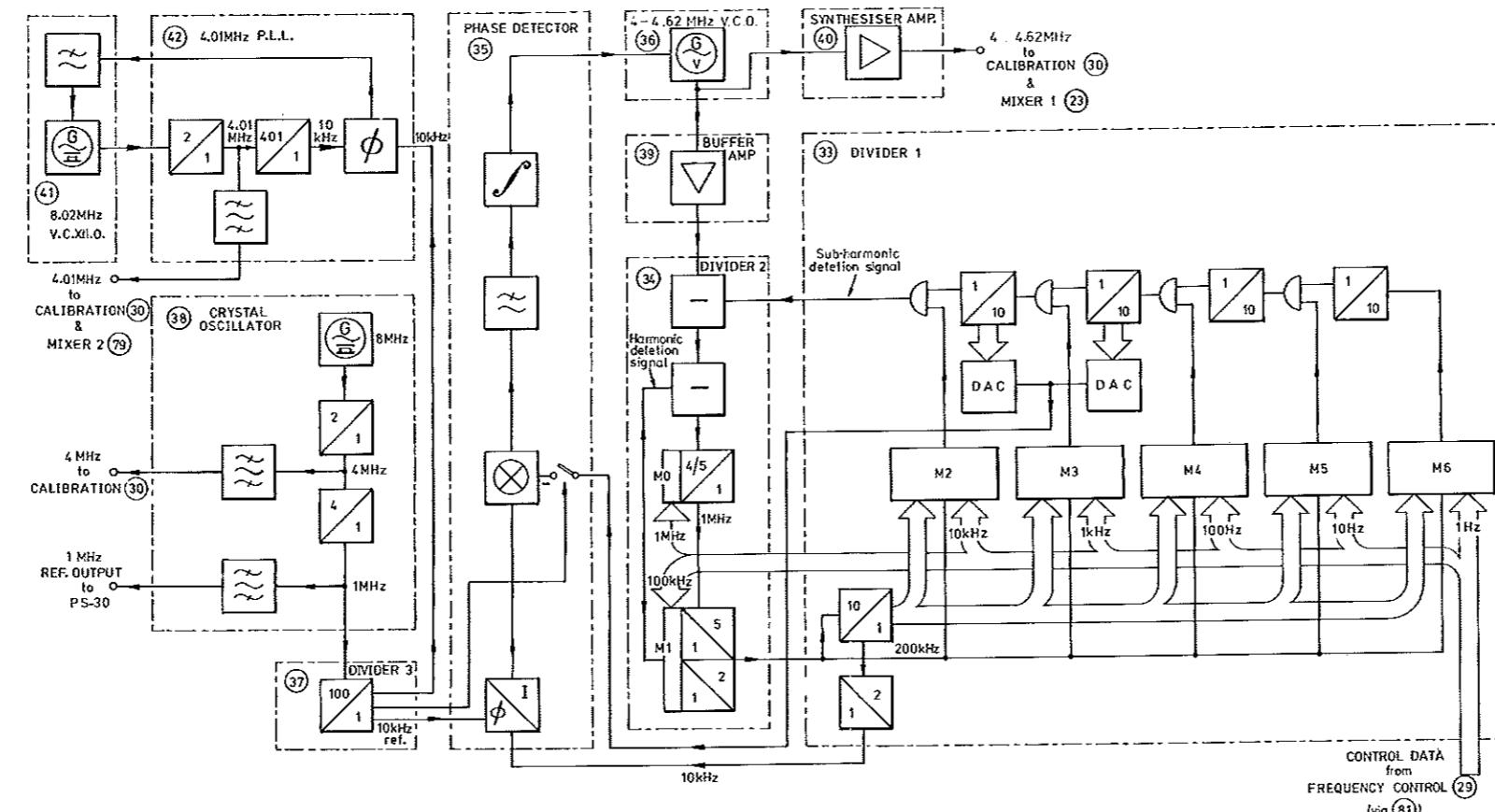


Fig. 2 Block Diagram of Synthesiser Assembly, (12)

(Used on the Parts Lists throughout this Appendix)

MF	Metal Film
Tant.	Tantalum
Cer.	Ceramic
PE	Polyester
PF	Polystyrene Film
CF	Carbon Film
W/W	Wirewound
Elec.	Electrolytic
Var.	Variable
Al. Ox.	Aluminium Oxide

Key to Component Type Abbreviations

PARTS MOUNTED ON OR FORMING PART OF FRONT PANEL

TYPE	PART NO.
METER, DS 48 SIFAM (with VOLTAGE SCALE)	4502-8103.009/4
C.F. SOCKET, 3-pole (BALANCED INPUTS)	0000-3713.006/4
SWITCH, SLIDE D.P.S.T. (dB/dBm SWITCH)	0001-7604.409/-
VERSACON BODY	0000-1681.004/5
VERSACON LOCKING RING (UNBALANCED INPUT)	0000-1672.055/5
RESISTOR, VARIABLE (CAL. ▽/WIDE) 10k, 1W	0000-7545.270/-
RESISTOR, VARIABLE (CAL. ▽/SELECTIVE) 10k, 1W	0000-7545.270/-
SWITCH, ROTARY (MEAS. RANGE)	0000-7602.469/4
SOCKET, EARTHING	0000-3004.045/4
SWITCH BUTTON (CHECK BATT. and □)	
PSE-31 O/P LEVEL)	0000-3705.425/5
SWITCH, MICRO (CHECK BATT. and □)	
PSE-31 O/P LEVEL)	0001-0034.176/-
L.E.D., RED (MAINS ON)	0001-0064.036/-
TACHO. GENERATOR (TUNING CONTROL)	0829-7036.821/5
SWITCH, SLIDE D.P.D.T. (MEAS./CHARGE/OFF)	0001-0069.439/-
VERSACON BNC ADAPTOR	0000-1674.008/5
KNOB (O/P LEVEL)	0000-7500.383/-
CAP, KNOB (O/P LEVEL)	0000-7500.396/-
KNOB (FINE)	0001-0063.396/-
CAP, KNOB (FINE)	0001-0063.707/-
KNOB (FREQUENCY CONTROL)	0001-0063.422/-
CAP, KNOB (FREQUENCY CONTROL)	0001-0063.710/-
KNOB (MEAS. RANGE)	0001-0063.493/-
CAP, KNOB (MEAS. RANGE)	0001-0063.749/-
KNOB (CAL. ▽ WIDE and SELECTIVE)	0001-0063.354/-
CAP, KNOB (CAL. ▽ WIDE and SELECTIVE)	0001-0063.684/-
SWITCH, SLIDE, D.P.D.T. (USB/OFF/LSB)	0001-0069.439/-

COMPLETE CHASSIS ASSEMBLY

REF.	TYPE	PART NO.
A10	ASSEMBLY, TRACKING OSCILLATOR PSE-31	4502-1110.002/2
	Includes ASSEMBLY, P.C.B. A80, PSE-31	4502-1080.006/2
A104	ASSEMBLY, POWER UNIT	4502-1189.004/2
	Includes ASSEMBLY, P.C.B. A84, POWER SUPPLY	4502-1084.002/3
A22	ASSEMBLY, PRE-AMPLIFIER	4502-1122.006/3
A23	ASSEMBLY, MIXER 1	4505-1023.004/3
A27	ASSEMBLY, I.F. AMPLIFIER & PROM	4502-1027.001/3
A29	ASSEMBLY, FREQUENCY CONTROL	4505-1029.008/3
A30	ASSEMBLY, CALIBRATION	4502-1030.001/3
A32	ASSEMBLY, DISPLAY	4502-1032.009/3
A33	ASSEMBLY, DIVIDER 1	4502-1033.008/3
A34	ASSEMBLY, DIVIDER 2	4502-1034.007/3
A35	ASSEMBLY, PHASE DETECTOR	4502-1035.006/3
A36	ASSEMBLY, 4...4.62MHz V.C.O.	4502-1036.005/3
A37	ASSEMBLY, DIVIDER 3	4502-1037.004/3
A38	ASSEMBLY, 8MHz CRYSTAL OSC	4502-1038.003/3
A39	ASSEMBLY, BUFFER AMP.	4502-1039.002/3
A40	ASSEMBLY, SYNTHESISER AMPLIFIER	4502-1040.004/3
A41	ASSEMBLY, 8.02MHz V.C.O.	4502-1041.003/3
A42	ASSEMBLY, 4.01MHz P.L.L.	4502-1042.002/3
A66	ASSEMBLY, 4MHz B/P FILTER UNIT	4502-1166.000/3
	Includes ASSEMBLY, P.C.B. A24	4502-1024.004/3
A77	ASSEMBLY, 24Hz FILTER	4502-1077.006/3
A79	ASSEMBLY, MIXER 2	4502-1079.004/3
A81	ASSEMBLY, INTERCONNECTION	4502-1081.005/3
A82	ASSEMBLY, MATCHING UNIT	4502-1082.004/3
A83	ASSEMBLY, METER AND DEMODULATOR	4502-1083.003/3

CABLE ASSEMBLIES

TYPE	PART NO.
CABLE ASSEMBLY, INTERCONNECTION TO DISPLAY 75mm Long	4502-1060.013/4
CABLE ASSEMBLY, INTERCONNECTION TO DISPLAY 90mm Long	4502-1060.026/4
CABLE ASSEMBLY, PRE-AMPLIFIER TO INTERCONNECTION	4502-1062.008/4
CABLE ASSEMBLY, PSE-31 TO INTERCONNECTION	4502-1063.007/4
CABLE ASSEMBLY, PART OF INTERCONNECTION, 40-way	4502-1064.006/4
CABLE ASSEMBLY, DIVIDER 1 TO DIVIDER 2, 14-way	4502-1067.016/4
CABLE ASSEMBLY, MATCHING UNIT TO PRE-AMPLIFIER, 14-way	4502-1067.029/4
CABLE ASSEMBLY, CONNECTING CALIBRATION TO MIXER 1 and SYN. AMP., and CALIBRATION TO MIXER 2 and 4.01MHz P.L.L., COAXIAL	4502-1069.001/3
CABLE ASSEMBLY, from SOCKET □ on REAR PANEL TO INTERCONNECTION, COAXIAL	4502-1071.001/4
CABLE ASSEMBLY, from SOCKET □ on REAR PANEL TO CRYSTAL OSCILLATOR, COAXIAL	4502-1072.001/4
CABLE ASSEMBLY, 24Hz FILTER TO I/F AMPLIFIER, COAXIAL	4502-1051.019/4
CABLE ASSEMBLY, PSE-31 TO METER, COAXIAL	4502-1051.022/4
CABLE ASSEMBLY, CALIBRATION TO MATCHING UNIT, COAXIAL with Fe BEADS	4502-1053.004/4
CABLE ASSEMBLY, 24Hz FILTER TO MIXER 2, COAXIAL	4502-1054.016/4
CABLE ASSEMBLY, MIXER 1 TO MIXER 2, COAXIAL	4502-1054.029/4
CABLE ASSEMBLY, PSE-31 TO CALIBRATION, COAXIAL with Fe BEADS	4502-1056.001/4
CABLE ASSEMBLY, METER TO PRE-AMPLIFIER, COAXIAL	4502-1057.000/4
CABLE ASSEMBLY, 4MHz FILTER TO INTERCONNECTION, COAXIAL	4502-1058.009/4
CABLE ASSEMBLY, POWER SUPPLY TO MIXER 2 (+10V)	4502-1073.000/4
CABLE ASSEMBLY, POWER SUPPLY TO REST OF INSTRUMENT includes P.C.B. A46	4502-1065.005/1
	4502-0146.006/3

REAR PANEL

VALUE	RATING	TYPE	PART NO.
T315mA	250V	SWITCH, (BATT CHARGER ON/OFF)	0001-7604.409/-
		SOCKET, BNC	0000-7598.696/-
		FUSELINK, BELLING-LEE	
		2080A/0.315A	0001-0020.601/-
		OR	
T630mA	115V	FUSELINK, BELLING-LEE	
		2080A/0.63A	
		FUSEHOLDER, BELLING-LEE	
		L2006A (20m x 5mm)	0000-7602.236/-
		BATTERIES, BEREC	
		NCC400 SIZE D (12 used)	0000-7594.849/-
T1A	BATT.	FUSELINK, ANTI-SURGE	0001-0020.711/-

REF.	TYPE	PART NO.
SK1	SOCKET, DIL 16-WAY	0000-7518.391/-
SK2	SOCKET, EDGE	
	CONNECTOR 10-WAY	0000-7602.317/-
SK3	SOCKET, EDGE CONNECTOR	
	10 + 10-WAY	0000-7602.304/-
SK4	SOCKET, EDGE CONNECTOR	
	36-WAY	0000-7602.333/-
SK5	SOCKET, EDGE CONNECTOR	
	36-WAY	0000-7602-294/-
SK6	SOCKET, EDGE CONNECTOR	
	20-WAY	0000-7602.320/-
SK7	SOCKET, DIL 16-WAY	0000-7518.391/-
SK8	SOCKET, DIL 16-WAY	0000-7518.391/-
SK10	SOCKET, DIL 16-WAY	0000-7518.391/-
S1	SWITCH, 4-PUSHBUTTON	
	(MODE)	4502-1074.009/4
S2	SWITCH, 3-PUSHBUTTON	
	(BANDWIDTH)	4502-1075.008/4
S3	SWITCH, 3-PUSHBUTTON	
	(FREQUENCY CONTROL)	4502-1076.007/4
	CAPS FOR SWITCHES ABOVE	0000-7602.744/-

SPARES

VALUE	RATING	TYPE	PART NO.
T0.315A	250V	FUSELINK, BELLING-LEE 2080A/0.315A ANTI-SURGE	0001-0020.601/-
T1A	BATT.	FUSE LINK, ANTI-SURGE	0001-0020.711/-
		BATTERIES, BEREC NCC400 SIZE D (12 used)	0000-7594.849/-

ACCESSORIES

CABLE ASSEMBLY, MAINS 2 metres long, 3-core
L1949 BELLING-LEE

A81	P.C.B., INTERCONNECTION	4502-1081.005/3
R1	12k1	1
C1	220 $\mu$	0W35
C2	22n	MF
		0001-0002.218/-
		0001-0041.842/-
		0001-0006.416/-

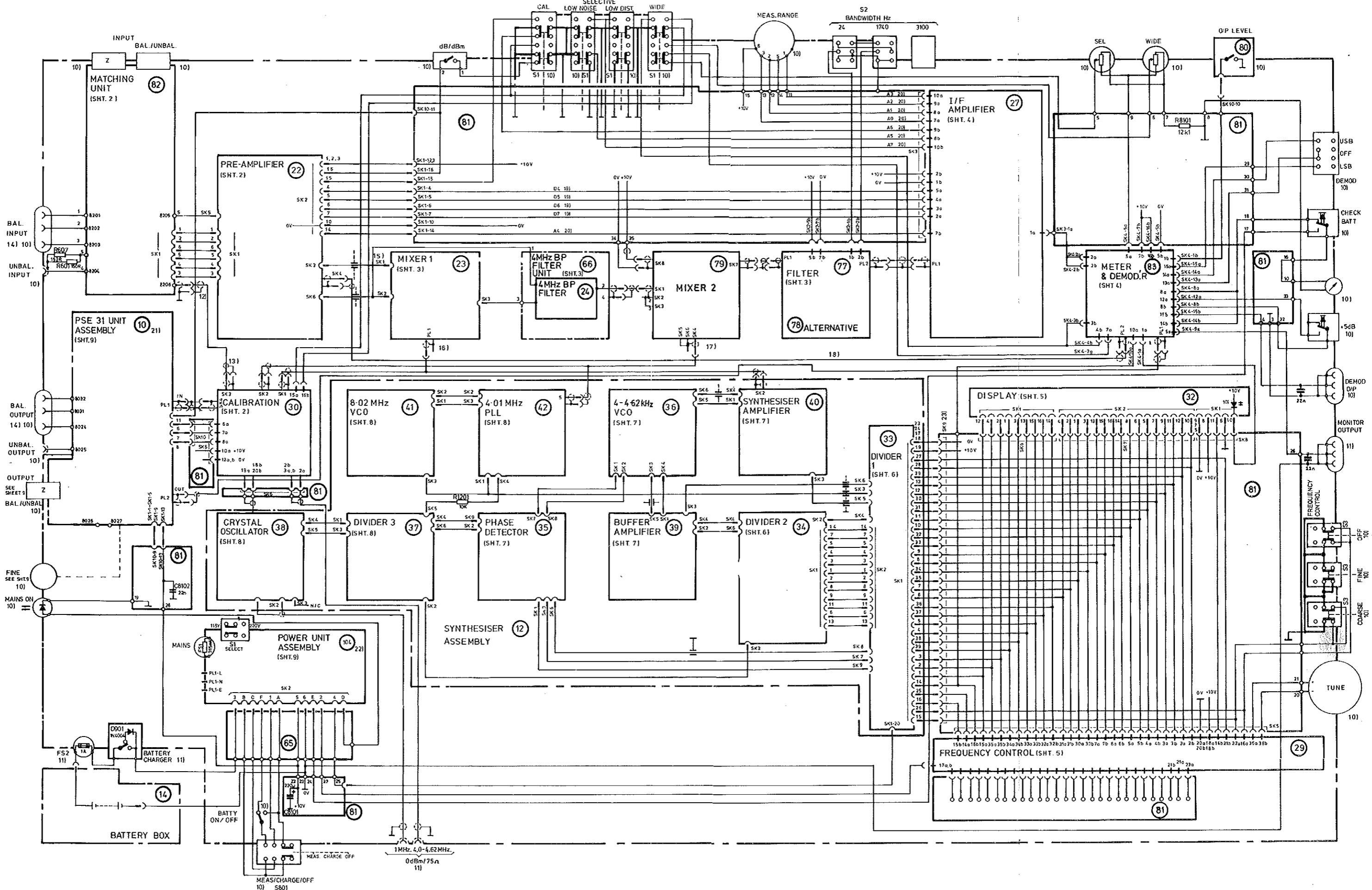


Fig. 3 Interconnections Diagram

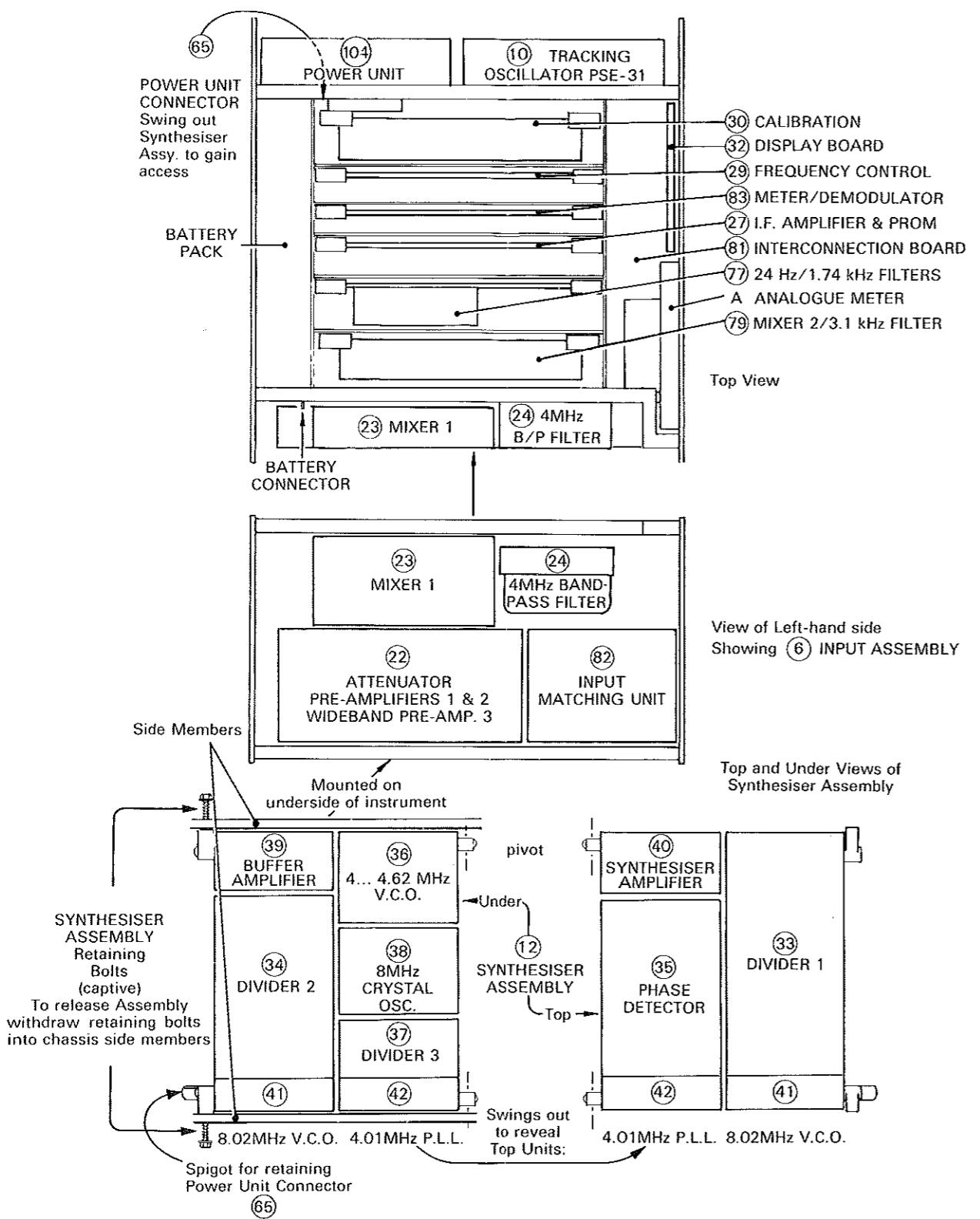
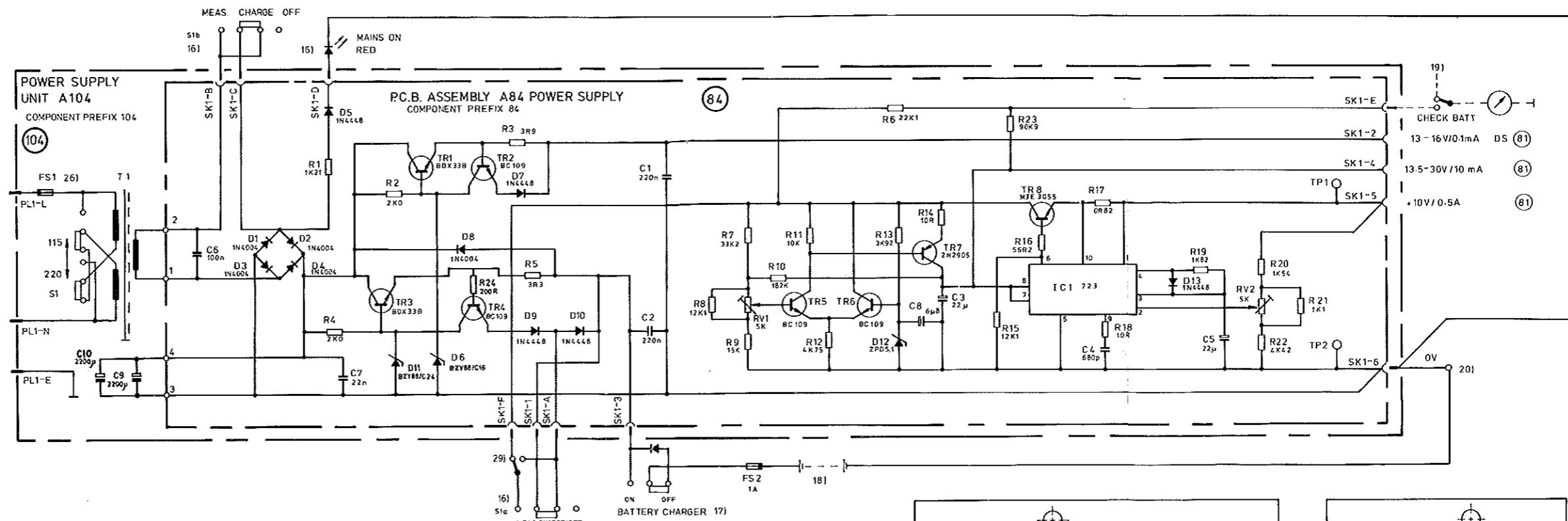


Fig. 4 Location of units within Instrument

Fig. 5 Circuit Diagram,  
Power Supply 104

15) OUTPUT LEVEL MONITOR FACILITY  
16) ON FRONT PANEL MAINS ON  
17) ON BACK PANEL  
18) BATTERY BOX  
19) FROM METER BOARD VIA INTERCONNECTION BOARD.  
20) TO INTERCONNECTION BOARD PIN 23  
21) 220V - 315mA, 115V - 630mA  
22) FINE LEVEL CONTROL  
23) RESISTORS NOT FITTED ON STD SERIES  
24) COVER OPERATED OFF SWITCH

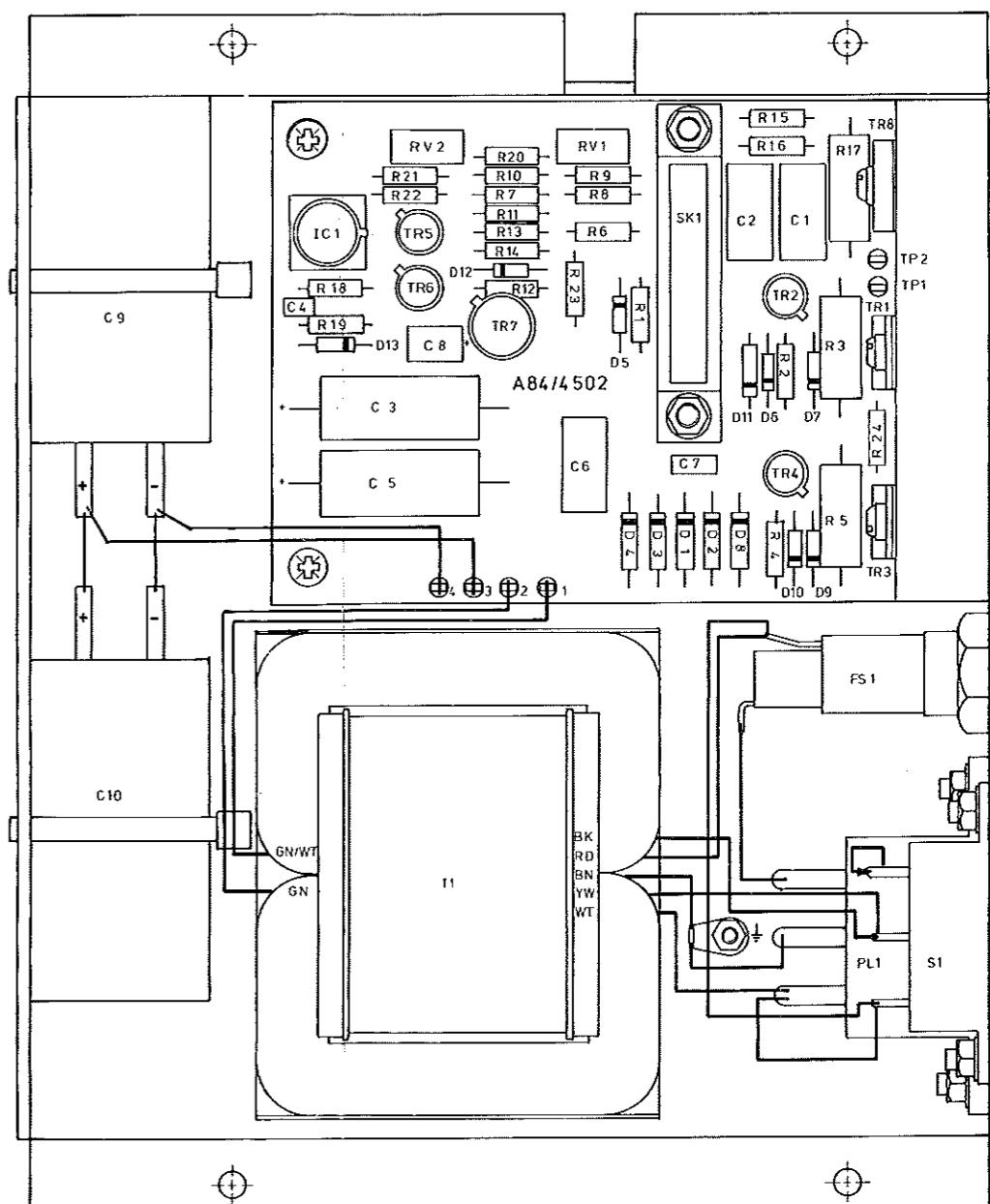


ASSEMBLY A104 POWER SUPPLY

REF.	VALUE	TOL. ± %	RATING	TYPE	PART NO.
C9	2200 $\mu$		40V	ELEC.	0000-7646.289/-
C10	2200 $\mu$		40V	ELEC.	0000-7646.289/-
S1				SELECTOR SWITCH	
			115V/220V		0000-7598.706/-
T1				MAINS TRANSFORMER	4502-1308.005/4
PL1				PLUG, MAINS INPUT	0001-0033.261/-
FS1	250V			FUSELINK, T 315mA	0001-0020.601/-
	115V			FUSELINK, T 630mA	
FS2	Batt.			FUSELINK, T 1A	0001-0020.711/-
A84				P.C.B. POWER SUPPLY	
				UNIT	4502-1084.002/3

ASSEMBLY P.C.B. A84, used on A104 POWER SUPPLY

REF.	VALUE	TOL. ± %	RATING	TYPE	PART NO.
R1	1k21	1	0W35	MF	0001-0001.277/-
R2	2k	1	0W35	MF	0001-0001.455/-
R3	3R9	5	1W6	W/W	0000-7601.583/-
R4	2k	1	0W35	MF	0001-0001.455/-
R5	3R3	5	1W6	W/W	0000-7601.570/-
R6	22k1	1	0W35	MF	0001-0002.441/-
R7	33k2	1	0W35	MF	0001-0002.603/-
R8	12k1	1	0W35	MF	0001-0002.218/-
R9	15k	1	0W35	MF	0001-0002.289/-
R10	182k	1	0W35	MF	0001-0003.165/-
R11	10k	1	0W35	MF	0001-0002.137/-
R12	4k75	1	0W35	MF	0001-0001.824/-
R13	3k92	1	0W35	MF	0001-0001.730/-
R14	10R	1	0W35	MF	0001-0000.074/-
R15	12k1	1	0W35	MF	0001-0002.218/-
R16	56R2	1	0W35	MF	0001-0000.346/-
R17	0R82	5	2W	W/W	0000-7601.596/-
R18	10R	1	0W35	MF	0001-0000.074/-
R19	1k82	1	0W35	MF	0001-0001.413/-
R20	1k54	1	0W35	MF	0001-0001.361/-
R21	1k1	1	0W35	MF	0001-0001.235/-
R22	4k42	1	0W35	MF	0001-0001.785/-



CIRCUIT REFERENCES TO BE PRECEDED  
BY BOARD ASSEMBLY NUMBER e.g.  
IC1 BECOMES IC8401  
T1 — — T10401  
P.C.B. POWER SUPPLY  
UNIT (less components) 4502-0284.007/3

Fig. 6 Component Layout,  
Power Supply 104

**ASSEMBLY FOR P.C.B. A82 MATCHING UNIT**

REF.	VALUE	TOL. ± %	RATING	TYPE	PART NO.	REF.	VALUE	TOL. ± %	RATING	TYPE	PART NO.	REF.	VALUE	TOL. ± %	RATING	TYPE	PART NO.
R1*	150R	0.25	1W	MF	0000-7549.603/-	R35	324R	1	0W35	MF	0001-0000.825/-	R114	22k1	1	0W35	MF	0001-0002.441/-
R2	150R	0.25	1W	MF	0000-7549.603/-	R36	301R	1	0W35	MF	0001-0000.799/-	R115	56k2	1	0W35	MF	0001-0002.797/-
R3	604R	0.25	1W	MF	0000-7511.262/-	R37	71R5	1	0W35	MF	0001-0000.443/-	R116	56k2	1	0W35	MF	0001-0002.797/-
R4	523R	1	0W35	MF	0001-0000.993/-	R38	150R	1	0W35	MF	0001-0000.618/-	R117	22k1	1	0W35	MF	0001-0002.441/-
R5	75R5	0.1	0W125	MF	0000-7601.567/-	R39	619R	1	0W35	MF	0001-0001.044/-	R118	56k2	1	0W35	MF	0001-0002.797/-
R6	8k25	2	0W35	MF	0001-0002.056/-	R40	5k62	1	0W35	MF	0001-0001.895/-	R119	22k1	1	0W35	MF	0001-0002.441/-
R7*	152R	0.25	1W	MF	0000-7549.616/-	R41	4k7	2	0W25	MF	0001-0001.811/-	R120	56k2	1	0W35	MF	0001-0002.797/-
R8	432R	1	0W35	MF	0001-0000.935/-	R42	22k1	1	0W35	MF	0001-0002.441/-	R121	22k1	1	0W35	MF	0001-0002.441/-
R109	10k	1	0W35	MF	0001-0002.137/-	R43	100R	1	0W35	MF	0001-0000.537/-	R122	9 x 100k	2	0W2	RESISTOR PACK	0000-7604.441/-
R110	56k2	2	0W35	MF	0001-0002.797/-	R50	22k1	1	0W35	MF	0001-0002.441/-	R123	1k5	1	0W35	MF	0001-0001.358/-
RV1	500R	20	0W5	Var.	0000-7601.651/-	R51	33k	2	0W25	MF	4980-0000.009/-	C5	4p7	0p25	63	Cer.	0001-0004.083/-
C1	47u	+50-10%		B42190-C8476-T	0001-7520.460/-	R52	68R1	1	0W35	MF	0001-0000.427/-	C6	15p	2	63	Cer.	0001-0004.229/-
C3	100p	2			0001-0004.517/-	R53	3k16	1	0W35	MF	0001-0001.646/-	C7	4p7	0p25	63	Cer.	0001-0004.083/-
C80	10n	10	40V	Cer.	0001-0004.818/-	R54	1k65	1	0W35	MF	0001-0059.232/-	C8	22p	2	63	Cer.	0001-0004.290/-
C81	1u	20	35V	Tant.	0001-0040.704/-	R55	330R	2	0W25	MF	0000-7601.389/-	C10	220n	10	100	PE	0001-0010.404/-
TR20				BCY71	0001-0016.534/-	R56	68R1	1	0W35	MF	0001-0000.427/-	C11	33p	2	63	Cer.	0001-0004.342/-
D22				1N914 or 1N4448	0001-0018.493/-	R57	100R	1	0W35	MF	0001-0000.537/-	C12	33u	20	10	Tant.	0001-0040.995/-
D31				1N914 or 1N4448	0001-0018.493/-	R58	845R	1	0W35	MF	0001-0018.587/-	C13	22p	2	63	Cer.	0001-0004.290/-
VG1	2 - 18p			809-05003	0000-7598.463/-	R59	1k1	1	0W35	MF	0001-0001.235/-	C14	33p	2	63	Cer.	0001-0004.342/-
S1 to S6						R60	68R1	1	0W35	MF	0001-0000.427/-	C15	220u	20	10	Tant.	0001-0041.208/-
						R61	2k67	1	0W35	MF	0001-0001.578/-	C16	330u	20	6.3	Tant.	0001-0041.211/-
L1	470uH			INDUCTOR	0000-7598.683/-	R62	681R	1	0W35	MF	0001-0001.086/-	C17	68p	2	63	Cer.	0001-0004.452/-
T1				TRANSFORMER	4502-1304.009/4	R63	4k7	2	0W25	MF	0001-0001.811/-	C18	220p	2	63	Cer.	0001-0004.601/-
SK1				SOCKET, D.I.L. 14-WAY	0000-7518.388/-	R64	68R1	1	0W35	MF	0001-0000.427/-	C19	10n	20	100	Cer.	0001-0004.818/-
RL1				RSD - 12V	0001-0069.620/-	R65	1k0	1	0W35	MF	0001-0001.219/-	C20	1u	20	35	Tant.	0001-0040.704/-
RL2				RSD - 12V	0001-0069.620/-	R66	750R	1	0W35	MF	0001-0001.125/-	C30	1u	20	35	Tant.	0001-0040.704/-
A82				P.C.B., MATCHING UNIT	4502-0260.005/3	R67	100R	1	0W35	MF	0001-0000.537/-	C31	33p	2	63	Cer.	0001-0004.342/-
* Shown as R0601 and R0607 respectively on the circuit diagram.						R68	470R	2	0W25	MF	0000-7560.608/-	C32	33u	20	10	Tant.	0001-0040.995/-
ASSEMBLY P.C.B. A22 PRE-AMPLIFIER & ATTENUATOR						R69	732R	1	0W35	MF	0001-0001.112/-	C33	22p	2	63	Cer.	0001-0004.290/-
						R70	402R	1	0W35	MF	0001-0000.906/-	C34	33p	2	63	Cer.	0001-0004.342/-

REF.	VALUE	TOL. ± %	RATING	TYPE	PART NO.	REF.	VALUE	TOL. ± %	RATING	TYPE	PART NO.	REF.	VALUE	TOL. ± %	RATING	TYPE	PART NO.
R7	9k	0.1	0W125	MF	0000-7601.512/-	R71	243R	2	0W25	MF	0001-0000.731/-	R72	68R1	1	0W35	MF	0001-0000.427/-
R8	1k11	0.1	0W125	MF	0000-7601.402/-	R73	2k21	1	0W35	MF	0001-0001.497/-	R74	2k0	1	0W35	MF	0001-0001.455/-
R9	9k	0.1	0W125	MF	0000-7601.512/-	R75	22k1	1	0W35	MF	0001-0002.441/-	R76	22k1	1	0W35	MF	0001-0002.289/-
R10	1k11	0.1	0W125	MF	0000-7601.402/-	R77	15k	1	0W35	MF	0001-0002.289/-	R78	15k	1	0W35	MF	0001-0002.289/-
R11	11k	0.1	0W125	MF	0000-7598.277/-	R79	15k	1	0W35	MF	0001-0002.289/-	R80	15k	1	0W35	MF	0001-0002.289/-
R15	100k	1	0W35	MF	0001-0002.991/-	R81	68R1	1	0W35	MF	0001-0000.427/-	R82	68R1	1	0W35	MF	0001-0000.427/-
R16	22k1	1	0W35	MF	0001-0002.441/-	R83	68R1	1	0W35	MF	0001-0000.427/-	R84	68R1	1	0W35	MF	0001-0000.427/-
R17	33k	2	0W25	MF	4980-0000.009/-	R85	698R	1	0W35	MF	0001-0001.099/-	R86	75R	1	0W35	MF	0001-0000.456/-
R18	68R1	1	0W35	MF	0001-0000.427/-	R87	330R	2	0W25	MF	0000-7601.389/-	R88	68R1	1	0W35	MF	0001-0000.427/-
R19	162R	1	0W35	MF	0001-0003.958/-	R89	18k	2	0W25	MF	0001-0027.484/-	R9					